

IDAHO

DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

PAHSIMEROI HATCHERY

Annual Report



1 October 1983 - 30 September 1984

by
Bob Moore
Fish Hatchery Superintendent II

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PAHSIMEROI HATCHERY

Annual Report

ABSTRACT

A total of 37 summer chinook salmon were trapped during the summer of 1984. The run consisted of 18 males, eight females and 11 jacks. A total of 23,999 green eggs were taken. A total of 112 spring chinook salmon were trapped at Hayden Creek Trap during summer of 1984. The fish were transported to Pahsimeroi Hatchery for spawning. The run consisted of 61 males, 47 females and four jacks. A total of 145,341 green spring chinook eggs were taken. A total of 97 spring chinook jacks were trapped at the Pahsimeroi Hatchery from the first smolt release in March 1983. We hope to get up to 1,000 returning adults in the summer of 1985.

On April 1, 1984, 55,803 summer chinook were released from the rearing ponds. These averaged 19 per pound for a total of 2,937 pounds. On March 3, 1984, 146,004 spring chinook smolts, averaging 23 per pound, were released from the rearing ponds. On April 1, another 997,025 spring chinook smolts were released from the rearing ponds. They averaged 19 per pound. The total plant of spring chinook smolts was 1,143,029 fish weighing 58,823 pounds.

A total of 13,786 group A steelhead and 97 group B steelhead were trapped at the hatchery. This is an all-time record for steelhead returns. Of these, 10,928 steelhead were hauled to tributaries of the Salmon River to spawn naturally. In the spring of 1984, 6,616,632 green group A eggs and 474,004 green group B eggs were taken. Over 3.5 million eyed eggs were shipped to Hagerman National and Niagara Springs hatcheries, and nearly 2 million were retained for backup and later planted as fry. A total of 1,795,000 group A fry were stocked in 23 tributaries of the upper Salmon River. During July and August, 192,600 group A fingerlings were stocked in Yankee Fork River system.

During the year, 42,657 pounds of fish were produced on 68,710 pounds of feed. The conversion rate for the year was 1.61.

Author:

Bob Moore
Fish Hatchery Superintendent II

OBJECTIVES

The objectives of the Pahsimeroi Hatchery are:

1. To provide a release point for 200,000 pounds of 7- to 12-inch steelhead from Niagara Springs Hatchery.
2. To collect up to nine million eggs from adult steelhead when they return from the ocean two to three years later.
3. To incubate and ship two million eyed eggs to Niagara Springs Hatchery.
4. To hatch the remainder of the eggs and redistribute fry into streams in the area for natural rearing.
5. To trap returning spring and summer chinook salmon and rear up to one million salmon smolts for release in the Salmon River drainage.

INTRODUCTION

Pahsimeroi Hatchery is owned and funded by Idaho Power Company. The salmon and steelhead programs are mitigation measures for dams constructed in Hells Canyon. The hatchery is located near Ellis, Idaho, on the Pahsimeroi River. It receives its water directly from the Pahsimeroi River and from a series of springs nearby. The incubators can be supplied with either river water or 52 F spring water.

The fish trap consists of three concrete pens measuring 15' x 75' x 3.5' deep. Fish are held in these pens until they are ripe and the eggs can be taken. The trap has a series of ladders in the structure and a specially built metal grate that keeps the fish from leaving the holding pen. A weir structure 55' long crosses the Pahsimeroi River to channel the arriving fish into the trap facility.

Near the trap facility are located a residence for the hatchery superintendent, two pumphouses, a 10,000 gallon water storage tank, two 10 x 50 mobile homes, a metal shop building, a cinderblock building used for an office, public restrooms and an incubator room with capacity for 20 double-stack Heath incubation cabinets. Four concrete raceways (4' x 100') are used to start salmon and steelhead fry.

Two dirt rearing ponds (40' x 300') are located six miles above the trap at a separate facility. These are used to rear and release chinook salmon smolts. Other facilities at the upper pond site include a residence, a small metal building, a feed bin to hold dry feed and a walk-in freezer to hold frozen salmon feed.

SUMMER CHINOOK SALMON

Between June 22 and September 26, 1984, thirty-seven summer chinook returned to the Pahsimeroi Trap. There were 11 jacks in the run returning from the March, 1983, release of 13,690 hatchery smolts. The return of eight female and 18 male adult summers was from remnant wild run of native Pahsimeroi stock. The size of the returning fish is found in Table 1.

Prespawning mortality in the holding pond was six fish; two males and four females. The four remaining summer chinook females were spawned between September 6 and September 17, 1984. A total of 23,999 green eggs were taken. The eye-up was 80%, leaving only 19,199 eyed eggs to be reared for release in 1985.

The 1982 brood year production of summer chinook amounted to 55,803 smolts. These fish were released on April 1, 1984. At release, the fish averaged 19 per pound (2,937 pounds) and were in very good condition. Table 2 shows the rearing data for this release group.

SPRING CHINOOK SALMON

In the summer of 1984, a total of 97 spring chinook jacks were trapped at Pahsimeroi. These fish were first-year returns from a 1983 smolt release of 437,332 fish from BY 81 Rapid River stock shipped to Pahsimeroi as eyed eggs in October of 1981. If this jack return is a good indicator, a substantial run of adult spring chinook can be expected in the summer of 1985.

Spring chinook returning to Hayden Creek Trap were brought to Pahsimeroi for holding and spawning in 1984. The first fish was trapped by July 8; the last on August 23. The run consisted of 112 fish, of which 61 were males, 47 were females and four were jacks. A total mortality of 21 fish, including six males and 15 females was recorded in the holding pond. The size composition of the returning spring chinook is found in Table 3.

Spring chinook were spawned twice a week from August 2 through September 10, 1984. A total of 145,341 green eggs were taken from 32 females (4,541 eggs per female). Eye-up on these eggs ranged from 68% to 99% and averaged 83.5% for the entire lot. Eyed eggs (121,359) will be hatched, and fish will be reared for release in the spring of 1986.

A test to determine the effect of water hardening chinook eggs in various concentrations of an iodine compound (Argentyne) was run on two takes of this egg lot. Water hardening in 1:100 and 1:50 Argentyne solutions had no negative effect on eye-up rate. Table 4 shows the egg-taking data.

Table 1. Size distribution of summer chinook salmon returning to
Pahsimeroi in 1984.

	Males	Females
22-23	11	
27	2	
28	1	
29	4	
30	3	1
31	1	1
32		1
33		2
34	2	
35	1	3
36	1	
37	0	
38	2	
39	0	
40	1	
Total	30	5

Table 2. Rearing history of BY 82 Pahsimeroi chinook salmon.

Females spawned	Green eggs	Eyed Eggs	Fingerlings ponded	Smolts
13	75,402	71,104	64,485	55,803
(74.0%) ^{1/}		(94.3%) ^{1/}	(85.5%) ^{1/}	

^{1/}Expressed as % of green eggs.

Table 3. Size distribution of spring chinook salmon trapped at Hayden Creek Trap, 1984.

Length (in.)	Males	Females
12-23	4	
26	2	
27	1	
28	3	1
29	4	5
30	2	4
31		3
32	1	4
33	4	4
34	4	11
35	8	7
36	19	8
37	7	0
38	4	0
39	2	0
Total	65	47

Table 4. Spring chinook salmon egg-take data, 1984.

Date	Female	Egg number	% eye-up	Comments
8/2	1	4,717	97	
8/6	3	15,779	83	
8/10	4	20,267	78	
8/16	7	21,904	72	
8/20	4	19,953	68	
8/21	2	10,853	97	
8/23	1	4,819	95	
8/27	2	9,178	97	
8/30	1	5,045	94	
9/3	4	11,210	94	1:100 Argentyne Control
9/3		9,034	88	
9/6	1	6,444	88	
9/10	2	3,340	99	1:50 Argentyne Control
9/10		2,798	98	
Total	32	145,341	83.5%	

There were two releases of BY 82 spring chinook from Pahsimeroi. On March 3, 1984, 146,004 spring chinook smolts were released. They averaged 23 per pound. On April 3, 1984, another 997,025 spring chinook smolts were released from the ponds. These averaged 19 per pound. The total spring chinook release was 1,143,029 smolts weighing 58,823 pounds. Fish in this release were a combination of Hayden Creek and Rapid River stocks. Rearing data on this release group is found in Table 5.

STEELHEAD

A record number of A-strain steelhead returned to Pahsimeroi in the fall of 1983 and spring of 1984. The one-ocean return was a result of the 1982 plant of 1,055,989 smolts. The two-ocean returns were from the 914,845 smolts released in the spring of 1981. A total of 13,883 steelhead, including 97 B-strain, returned.

The first A-run fish returned to the weir on September 24, 1983. In the fall segment there were 45 females and 34 males, of which 69 were one-ocean and 10 were two-ocean fish. Twenty of the 79 fall arrivals were adipose clipped.

The spring run began on February 10 and ended on May 21, 1984. There were 7,908 females and 5,799 males in this segment of the A-run. Ninety-seven B-run fish, including 25 males and 72 females, were also collected in the spring. The arrival timing of the run can be seen in Figure 1. An all-time one-day record was set on March 30, when 972 fish entered the trap in a 24-hour period.

Over 82% of the 1983 brood year return was composed of one-ocean fish. Females returning were 89.9% one-ocean, while males were 72% one-ocean. The age composition of the run by sex is shown in Table 6.

Prespawning mortality was minimal in this group. Only 29 fish, including 19 females and 10 males, died in the holding pond.

Due to extremely high return, we were able to outplant a large number of adult steelhead into underseeded spawning and nursery areas during the spring of 1984. Nearly 11,000 ripe fish were released for natural spawning. A total of 6,133 female and 4,795 male A-run adults were outplanted. Outplanting is summarized in Table 7.

Steelhead were spawned twice weekly from March 27 through May 4, 1984. A total of 1,677 A females (1,507 one-ocean and 170 two-ocean) and 870 males (627 one-ocean and 243 two-ocean) were spawned to get 6,616,632 green eggs. The A-run fish yielded an average of 3,945 eggs per female. Seventy-two B-run females were spawned to get 474,004 eggs, or 6,583 eggs per female.

Table 5. Rearing success of BY 82 spring chinook at Pahsimeroi.

Stock	Females	Green eggs	Eyed eggs	Fingerlings	Smolts
Hayden Creek	32	145,341	121,360	N/A	N/A
Rapid River	385	1,531,034	1,332,000	N/A	N/A
Total	417	1,676,375	1,453,360	1,368,510	1,143,029
Percent <u>1</u> /	--	--	86.7	81.6	68.2

1/Expressed as percent of green eggs.

Table 6. Age composition of brood year 1983 A-run steelhead by sex, returning to Pahsimeroi.

	1-Salt	%	2-Salt	%	Total
Males	4,200	72.0	1,633	28.0	5,833
Females	7,150	89.9	803	10.1	7,953
Total	11,350	82.3	2,436	17.7	13,786

Table 7. Adult A steelhead planted from Pahsimeroi, spring 1984.

Location	Number females	Number males	Total
Upper Pahsimeroi	873	732	1,605
Lemhi	1,729	1,325	3,054
Upper Salmon River	1,284	1,058	2,342
Valley Creek	880	670	1,550
Yankee Fork	1,025	675	1,700
Panther Creek	<u>342</u>	<u>335</u>	<u>677</u>
Total	6,133	4,795	10,928

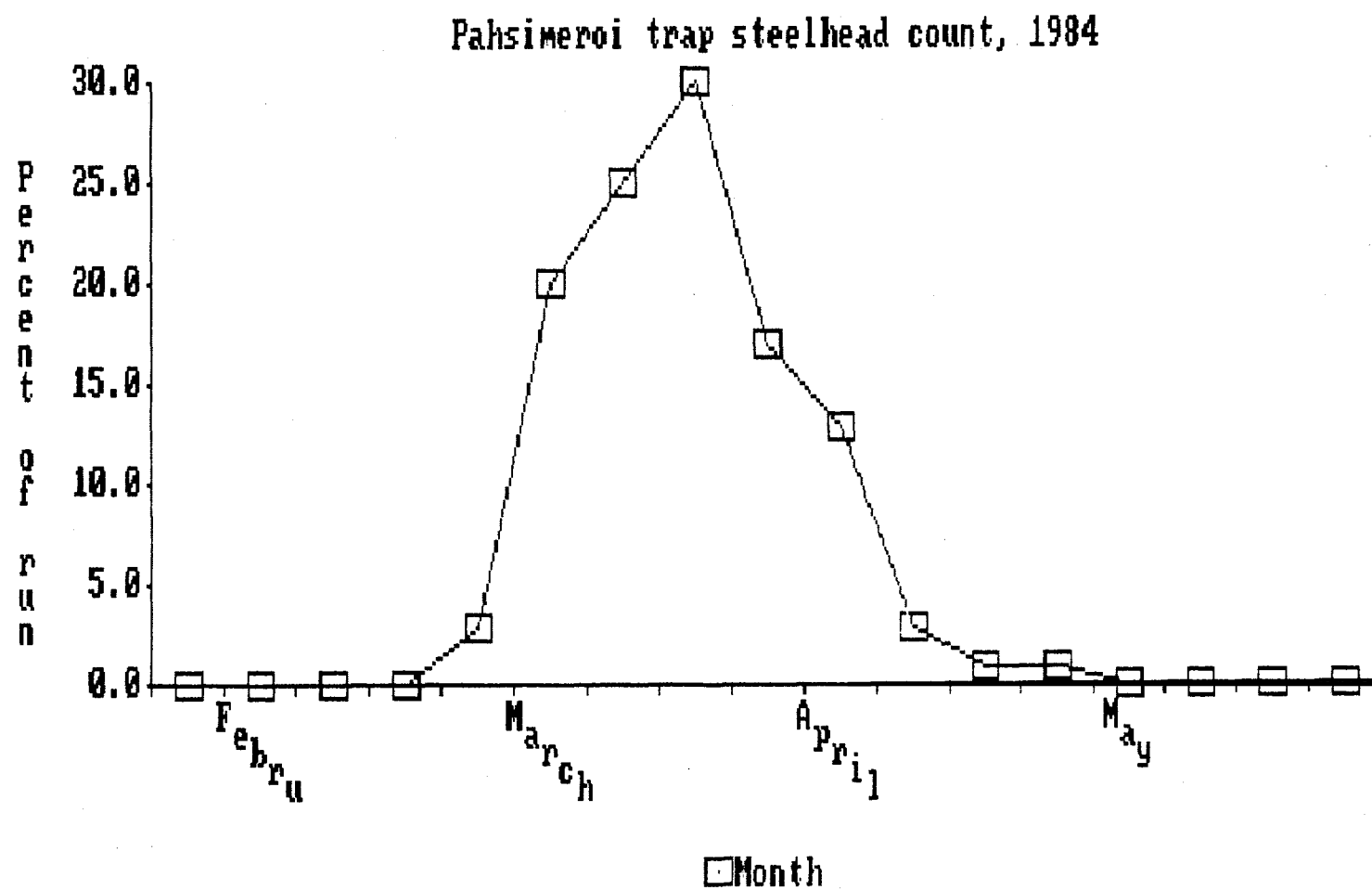


Figure 1. 1984 Steelhead run.

The eye-up was better overall in the A-run than in the B-run fish. The A eggs averaged 86.7% eye-up, while the B eggs eyed at 76.4%. Several experiments were run to see if the length of time the fish were held had an obvious effect on eye-up. These will be discussed later in this report.

Pahsimeroi shipped over 3.5 million eyed eggs to Niagara Springs and Hagerman National hatcheries. In addition, nearly 2 million eyed eggs were retained at Pahsimeroi to provide a backup supply in case of a serious problem at either of the rearing stations. As no problems occurred, these fry were available for outplanting into underseeded areas of the Salmon River drainage. Egg shipments and fry outplants can be seen in Tables 8 and 9, respectively.

The effect of the arrival time of adults and length of time adults were held on the quality and disease status of the resulting eggs was tested during the spawning run. In the past, it was generally noted that eggs taken later in the season had a lower fertilization rate and were more prone to disease losses than those taken from the early part and middle part of the run. In general, we found that the eye-up was the highest when newly arrived fish were used and lowest in those "old" fish which had been held in the hatchery for three weeks or more. Presumably, the handling and sorting twice a week results in poorer eggs from the fish which mature in the holding pond than from those which arrive ripe. Eye-up from four, 150-ounce experimental lots taken on May 1 are seen in Table 10.

On April 10 and 13, several lots of eggs from "new" and "old" parents were taken to see if a difference in the carrier rate of IHN or IPN in the resulting fry could be found. All the samples were found to be virus free, so no conclusions were reached.

The 1984 spawning season was abnormally cool, and the eye-up rate was not reduced as is normal in the later spawning fish at Pahsimeroi. It was noted that fish arriving after May 1 had softer eggs with thinner shells even though the eye-up was not effected. The spawning results from the A-run steelhead can be seen in Table 11.

MISCELLANEOUS ITEMS

On April 16, 214 ounces of A steelhead eggs were taken at East Fork Trap and hauled to the Pahsimeroi Hatchery as green eggs. These eggs eyed-up at a rate of 79%. At the same time, sperm was taken from 12 males and put in plastic bags on ice to use for spawning the next day at Pahsimeroi. The day-old sperm was used to fertilize 275 ounces of green eggs. The eye-up from this group was 88%. Also, on this day, six males were killed and placed in ice to see if sperm could be transferred in this manner. Eggs fertilized with the sperm from dead males all failed to fertilize.

Table 8. Egg shipments from Pahsimeroi Hatchery, 1984.

Hatchery	Eyed A	Eyed B	Green B	Total
Niagara Springs	2,333,760	0	0	2,333,760
Hagerman National	1,161,600	353,353	8,600	1,523,553

Table 9. "A" steelhead fry plants from Pahsimeroi Hatchery, 1984

Date	Stream	Number
5/08	Squaw Creek	100,000
5/08	Morgan Creek	100,000
5/08	Iron Creek	100,000
5/10	Panther Creek	265,000
5/15	Lemhi River	100,000
5/16	Valley Creek	112,500
5/23	N.F. Salmon River	75,000
5/23	Basin Creek	75,000
5/23	Pine Creek	25,000
5/23	Indian Creek	50,000
5/23	Hughes	25,000
5/23	Sheep Creek	25,000
5/24	Slate Creek	25,000
5/29	Yankee Fork	50,000
5/29	W.F. Yankee Fork	30,000
5/29	Thompson Creek	20,000
5/30	Hughes Creek	11,250
5/30	N.F. Salmon River	33,750
5/30	Indian Creek	33,750
5/30	Sheep Creek	11,250
5/31	Pole Creek	317,500
6/04	Lemhi River	170,000
6/08	Musgrove Creek	40,000
Total A		1,795,000

Table 10. Egg viability experiments at Pahsimero1 on eggs taken
May 1, 1984.

Males	Females	% eyed
New	New	85.4
New	Old	84.0
Old	New	88.0
Old	Old	81.4

Table 11. Results of A-run steelhead spawning at Pahsimeroi, 1984.

Date	No. females	No. eggs	% eyed
3/27	189	887,040	88
3/30	125	550,440	87
4/03	152	633,600	77
4/06	182	760,848	86
4/10	173	627,528	89
4/13	184	707,520	86
4/17	187	660,000	87
4/20	154	571,296	93
4/24	178	673,200	89
4/27	68	237,600	90
5/01	51	174,240	85
5/04	34	133,320	88
Total	1,677	6,616,632	Average 86.7

All the eggs taken at the station this year were water hardened in 1:100 parts of Argentyne iodine. The question has arisen about how much iodine would be lethal to green eggs. Hardening eggs for 30 minutes in 100% Argentyne resulted in immediate mortality of all the eggs. We will experiment further to see where the lethal effect of iodine starts.

GENERAL COMMENTS

This year's spawning season was ideal as far as temperatures were concerned. The water in the trap stayed around 45 degrees through May 4, and we got one of the best eye-up percentages ever on A-run fish. The A-run fish were in excellent body condition all spring. The B-run fish did not look quite as good as in previous years, and the eye-up percentage was somewhat lower than in previous years.

We had 2,200 females on hand during the peak of the trapping. It took two workers nearly six hours to sort them for ripeness. Due to the large numbers of fish that had to be handled, the fish were stressed from crowding and handling. All the ad-clipped fish were being held for spawning in the early part of the spawning season. Due to the frequency of handling, the quality of the fish and eggs began to deteriorate. This necessitated a change in procedure, so we began saving only a portion of the ad-clipped fish and started spawning more newly arrived fish. The oldest females in the holding pen were all planted to spawn naturally. The eye-up rate and egg quality improved when we used newly arrived fish each spawning day.

We cannot physically handle any more fish than were in the run this year. If future runs contain more than 14,000 returning adults, some provisions will have to be made to haul out green fish or limit entry into the trap.

The spawning was done again this year with a colander to drain the ovarian fluid from the eggs. Eggs from six females were combined in a bucket. Milt was added to the pool as the eggs from each female were added to the bucket. We used six males to six females. The eggs were hand stirred at the end to ensure fertilization. This technique is to include more males in the gene pool. The egg shipments to Niagara and Hagerman were made from 12 spawning periods throughout the run to get a wider genetic distribution in the smolt population.

Everything considered, this has been a very good spawning season with healthy fish, excellent eggs, ideal water conditions and a host of very happy steelhead fishermen over this entire area.

Between April 2 and April 24, 1984, 189,000 pounds of type A smolts were planted at Pahsimeroi Hatchery for a total of 752,195 smolts. The smolts averaged 3.97 per pound at planting time. For the rearing history of these fish see Niagara Springs annual hatchery report.

Approximately 3,000 spawned-out steelhead weighing about 15,000 pounds were given to the public. The fish were given out on a "first come, first serve" basis.

FISH HEALTH

Salmon and steelhead fry kept in the raceways are treated periodically with Benzylkrominium Chloride at the rate of 3 ppm for one hour to prevent bacterial gill infections. The salmon fingerlings were fed erythromycin feed for three weeks in July to help combat bacterial kidney disease.

During the summer, two raceways of fingerling steelhead were diagnosed positive for IPN and IHN virus. All the infected fish, amounting to 152,000 fingerlings weighing 400 pounds, were destroyed. These were the only fish on the hatchery which had serious disease problems. The remaining fish were in good health.

The salmon spawners from Hayden Creek were all injected with erythromycin phosphate to try to control kidney disease and reduce mortality prior to spawning. The Pahsimeroi summer chinook were not injected. Samples were taken from each group to see if these injections were beneficial. It appeared that approximately half of the fish from each group were positive for kidney disease at the time of spawning.

The green salmon eggs were water hardened in erythromycin solution to try to minimize kidney disease. Test groups were water hardened in 1:100 and 1:50 Argentyne solutions. Controls were kept on each group to see if the eye-up and egg development were affected. The eye-up percentage of the eggs in neither test was affected by the iodine treatments. The 1:100 test group and control group were both negative for bacteria, so the egg lot was probably free at spawning. The 1:50 test group was negative for kidney disease bacteria but the control group was positive. Further testing is needed to see if Argentyne water hardening may be beneficial in controlling kidney disease bacteria in green salmon eggs.

The steelhead eggs were water hardened with 1:100 Argentyne iodine solution for 30 minutes and then in water for 30 minutes longer.

The canal that feeds the trap was treated with Cutrine and Diquat herbicides to kill rooted vegetation that impedes water flow during late summer. The canal was shut off and sprayed with a mixture of these two herbicides. After seven hours, the water was turned back into the canal. The vegetation turned brown for a month and then started to grow again. The delay in the plant growth gave us plenty of water flow through the salmon trapping season.

FISH PRODUCTION SUMMARY

October 1, 1983 - September 21, 1984

On October 1, 1983, 36,381 pounds of salmon smolts were on hand. In the spring of 1984, 61,760 pounds of smolts were released. There were 560 pounds of kokanee hatched and transferred as fry to Mackay Hatchery. A total of 1,146 pounds of steelhead fry were planted during early summer of 1984. On September 30, 1984, 15,572 pounds of salmon were on hand.

61,760	pounds smolts released
560	pounds kokanee fry transferred
1,146	pounds steelhead fry released
<u>15,572</u>	pounds smolts produced and on hand at the end of fish year
79,038	total pounds
<u>-36,381</u>	minus pounds on hand at beginning of year
42,657	pounds production during year
67,655	pounds OMP fed during year
<u>1,055</u>	pounds dry feed during year
68,710	total pounds of fish food fed
1.61	fish feed conversion for fish rearing year

On October 28, 1983, a major earthquake shook the Pahsimeroi Valley. The epicenter was about 50 miles from the hatchery. The quake occurred at a little past eight o'clock. The water in the trap was sloshing two feet up the sides of the concrete. The alarm bell rang on

the incubator feed line due to the pressure changes in the line. All the ducks and geese took to the air and were flying around the hatchery. The air had a dust haze from rolling rocks in the nearby mountains. The nearby roads had loose rocks in the roadway. The Pahsimeroi River increased in flow about six inches and has stayed nearly that high since the quake. New hot water springs showed up in the valley. One neighbor now has a hot water spring in his corrals.

Due to extensive damage at Mackay Hatchery, 1,223,320 early spawning kokanee eggs were transferred from Mackay Hatchery to the Pahsimeroi Hatchery. They were hatched and transferred back during the winter and early spring months.

Due to the high water flow in the Pahsimeroi River, a section of streambank above the hatchery was rip-rapped by a local contractor through funds provided by Idaho Power Company. The site had been rip-rapped about 30 years ago because the river had cut through the bank and down into an old channel. The river was trying to do the same thing again. This would have bypassed the fish hatchery. The project entailed rip-rapping about 350 feet of streambank.

A 40-foot well was drilled during the year for domestic water. A pressure tank was installed in the pumphouse. The old pump from the spring was retained for lawn watering.

The salmon rearing ponds were cleaned by a local contractor. The silt accumulation was picked up by a backhoe and placed in a dump truck and hauled away.

The drum screens at the rearing ponds were repaired and cleaned by a local blacksmith. The tenon bearings were installed, and the drums were painted with a special rust removing paint.

Two YACC employees were assigned to the hatchery during the summer. They painted both pumphouses, the incubator rooms and several wooden structures around the hatchery, as well as wooden screens. They cleaned the entire grounds and performed a lot of yard work. They scrubbed, patched and disinfected 20 stacks of incubators.

A special coupler joint was plumbed into the river water pump line. If the emergency gas pump fails to start during a power failure, a portable water pump can be connected to the pump line to supply the incubators.

Three aluminum push racks and two live boxes were covered with 1 1/4 inch aluminum mesh wire.

ACKNOWLEDGEMENTS

Hatchery staffing during the fish year included:

Bob Moore, Fish Hatchery Superintendent II; Brad Christensen, Fish Hatchery Superintendent I; Arnie Miller, Temporary Fish Culturist for five months; Julie Christensen, Temporary Laborer for one month; Linda Zollinger, Temporary Laborer for one month; Scott Grunder, Temporary Laborer for two months; Tim French, Temporary Laborer for one month; Dave Stevenson, Temporary Laborer for 10 weeks; Kent Ball, Anadromous Research, took care of biological data during spawning; Marcia White, Cree! Census, helped with biological data on spawning days; Leni Olman, Sawtooth Hatchery Laborer, helped with shocking and picking salmon eggs for two weeks; Lynn Burton, Sawtooth NRA, coordinated volunteer help and helped on spawning days; Luke Charlton and Roscoe Hamilton, YACC employees for three months; Todd Bare, East Fork Trap employee, drove truck to plant adults for two weeks; Forest Service, 14 Forest Service employees volunteered their services on spawning days; BLM, three employees volunteered their services on spawning days; and Kevin McCoy, Sportsman Volunteer, helped with spawning sorting and loading trucks with steelhead spawners for three weeks during April. In addition, several sportsmen helped load trucks and measure fish on spawning days.